

Area of Region sq. km sq. mi FIA Plots
8,200.0 3,166.0 242

Species Information

The columns below provide brief summaries of the species associated with the region and described in the table on the next pages. Definitions are provided in the Excel file for this region.

Genus	Species	Abundance	Model		Potential Change in Habitat Suitability		Capability to Cope or Persist		Migration Potential					
			Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85				
Ash	2		High	21	23	Increase	21	26	Very Good	10	10	Likely	2	2
Hickory	5		Medium	25	42	No Change	16	12	Good	13	16	Infill	39	40
Maple	4	Abundant	Low	33	16	Decrease	16	15	Fair	10	9	Migrate	7	13
Oak	6	Common	FIA	4		New	16	19	Poor	10	8		48	55
Pine	3	Rare				Unknown	14	11	Very Poor	10	10			
Other	37	Absent							FIA Only	2	2			
	57	82		83	81		83	83	Unknown	10	7			
										65	62			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	52.0	53.9	56.2	56.4
	CCSM85	52.0	54.3	56.8	59.9
	GFDL45	52.0	54.7	57.6	58.5
	GFDL85	52.0	55.3	58.7	62.7
	HAD45	52.0	54.5	57.9	59.2
	HAD85	52.0	54.9	59.1	63.5
Growing Season May—Sep	CCSM45	66.7	68.7	70.9	71.4
	CCSM85	66.7	69.1	71.7	75.7
	GFDL45	66.7	69.9	73.5	74.8
	GFDL85	66.7	70.9	75.1	79.5
	HAD45	66.7	69.9	73.2	74.9
	HAD85	66.7	70.2	75.8	80.4
Coldest Month Average	CCSM45	29.1	31.0	32.3	32.8
	CCSM85	29.1	31.9	32.9	34.3
	GFDL45	29.1	32.7	33.2	33.9
	GFDL85	29.1	31.8	32.7	33.9
	HAD45	29.1	29.8	31.9	32.1
	HAD85	29.1	30.4	31.9	33.7
Warmest Month Average	CCSM45	71.9	74.1	75.3	75.6
	CCSM85	71.9	74.3	76.0	77.9
	GFDL45	71.9	75.5	77.6	78.6
	GFDL85	71.9	76.9	79.5	82.0
	HAD45	71.9	75.7	78.1	79.2
	HAD85	71.9	76.9	80.7	83.6

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	48.4	51.8	53.3	54.0
	CCSM85	48.4	52.9	54.2	58.9
	GFDL45	48.4	52.7	53.8	56.8
	GFDL85	48.4	50.1	55.2	56.7
	HAD45	48.4	49.6	50.0	49.3
	HAD85	48.4	50.4	47.9	49.8
Growing Season May—Sep	CCSM45	23.1	25.3	25.8	25.9
	CCSM85	23.1	25.3	24.6	26.9
	GFDL45	23.1	25.0	24.4	25.9
	GFDL85	23.1	23.0	24.3	24.8
	HAD45	23.1	24.3	22.2	22.7
	HAD85	23.1	23.8	21.4	22.4

NOTE: For the six climate variables, four 30-year periods are used to indicate six potential future trajectories. The period ending in 2009 is based on modeled observations from the PRISM Climate Group and the three future periods were obtained from the NASA NEX-DCP30 dataset. Future climate projections from three models under two emission scenarios show estimates of each climate variable within the region. The three models are CCSM4, GFDL CM3, and HadGEM2-ES and the emission scenarios are the 4.5 and 8.5 RCP. The average value for the region is reported, even though locations within the region may vary substantially based on latitude, elevation, land-use, or other factors.

Cite as: Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. *Forests*. 10(11): 989. <https://doi.org/10.3390/f10110989>.

Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
yellow-poplar	Liriodendron tulipifera	WDH	High	90.2	1270.4	14.1	Sm. dec.	Lg. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	1
red maple	Acer rubrum	WDH	High	91.5	1191.0	13.0	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	2
sugar maple	Acer saccharum	WDH	High	85.4	853.7	10.0	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	3
chestnut oak	Quercus prinus	NDH	High	69.5	742.8	10.7	No change	No change	High	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	4
white oak	Quercus alba	WDH	Medium	58.5	530.2	9.1	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	5
northern red oak	Quercus rubra	WDH	Medium	67.1	488.2	7.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	6
American beech	Fagus grandifolia	WDH	High	74.4	483.5	6.5	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	7
black locust	Robinia pseudoacacia	NDH	Low	64.6	372.2	5.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	8
black cherry	Prunus serotina	WDL	Medium	48.8	350.0	7.2	Sm. dec.	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	9
sweet birch	Betula lenta	NDH	High	61	284.7	4.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	10
pignut hickory	Carya glabra	WDL	Medium	53.7	261.7	4.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	11
scarlet oak	Quercus coccinea	WDL	Medium	43.9	246.4	5.6	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++	Infill +	1	12
American basswood	Tilia americana	WSL	Medium	41.5	231.4	5.6	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	13
black oak	Quercus velutina	WDH	High	51.2	227.9	4.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
white ash	Fraxinus americana	WDL	Medium	61	221.7	3.6	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	15
sourwood	Oxydendrum arboreum	NDL	High	58.5	209.9	3.6	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	16
eastern hemlock	Tsuga canadensis	NSH	High	37.8	204.6	5.4	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	17
cucumbertree	Magnolia acuminata	NSL	Low	56.1	169.7	3.0	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	18
blackgum	Nyssa sylvatica	WDL	Medium	56.1	148.5	2.7	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	19
mockernut hickory	Carya alba	WDL	Medium	39	111.7	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	20
shagbark hickory	Carya ovata	WSL	Medium	29.3	103.4	3.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	21
yellow buckeye	Aesculus flava	NSL	Low	18.3	97.6	5.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	22
sycamore	Platanus occidentalis	NSL	Low	13.4	93.5	7.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	23
yellow birch	Betula alleghaniensis	NDL	High	14.6	87.5	6.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	24
Virginia pine	Pinus virginiana	NDH	High	13.4	80.7	6.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	25
sassafras	Sassafras albidum	WSL	Low	37.8	60.1	1.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	26
pitch pine	Pinus rigida	NSH	High	12.2	58.7	4.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	27
bitternut hickory	Carya cordiformis	WSL	Low	23.2	56.4	2.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	28
ailanthus	Ailanthus altissima	NSL	FIA	9.8	52.8	5.4	Unknown	Unknown	NA	Common	NNIS	NNIS			0	29
slippery elm	Ulmus rubra	WSL	Low	19.5	51.4	2.6	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	30
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	20.7	47.7	2.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	31
serviceberry	Amelanchier spp.	NSL	Low	25.6	36.9	1.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	32
paulownia	Paulownia tomentosa	NSL	FIA	7.3	34.7	4.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	33
American elm	Ulmus americana	WDH	Medium	7.3	26.5	3.6	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	34
pin cherry	Prunus pensylvanica	NSL	Low	13.4	26.3	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	20.7	25.7	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	36
eastern white pine	Pinus strobus	WDH	High	4.9	25.4	5.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	37
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	19.5	24.9	1.3	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	38
striped maple	Acer pensylvanicum	NSL	Medium	15.9	24.1	1.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	39
black walnut	Juglans nigra	WDH	Low	7.3	21.0	2.9	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	40
pawpaw	Asimina triloba	NSL	Low	8.5	16.8	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	41
bigtooth aspen	Populus grandidentata	NSL	Medium	3.7	10.8	3.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
flowering dogwood	Cornus florida	WDL	Medium	13.4	10.4	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	43
boxelder	Acer negundo	WSH	Low	1.2	8.0	6.6	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	44
eastern redbud	Cercis canadensis	NSL	Low	7.3	5.8	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	45
black willow	Salix nigra	NSH	Low	2.4	5.1	2.1	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	46
common persimmon	Diospyros virginiana	NSL	Low	2.4	4.4	1.8	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	47

Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
American holly	Ilex opaca	NSL	Medium	3.7	3.0	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	48
butternut	Juglans cinerea	NSLX	FIA	2.4	2.7	1.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	49
shellbark hickory	Carya laciniosa	NSL	Low	1.2	2.4	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
American chestnut	Castanea dentata	NSLX	FIA	4.9	2.1	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	51
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1.2	2.1	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	52
red spruce	Picea rubens	NDH	High	1.2	1.8	1.5	No change	No change	Low	Rare	Very Poor	Very Poor			2	53
eastern redcedar	Juniperus virginiana	WDH	Medium	1.2	1.8	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	54
river birch	Betula nigra	NSL	Low	1.2	0.9	0.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +		2	55
black ash	Fraxinus nigra	WSH	Medium	1.2	0.8	0.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	56
sweetgum	Liquidambar styraciflua	WDH	High	1.2	0.8	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	57
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	58
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	59
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	60
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	61
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	62
black maple	Acer nigrum	NSH	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	63
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	64
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	65
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	66
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	67
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	68
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	69
green ash	Fraxinus pennsylvanica	WSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	70
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	71
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	72
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	73
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	74
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	75
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	76
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	77
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	78
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	79
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	80
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	81
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	82
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	83